

CLAIMS

What is claimed is:

- 1 1. In a packet forwarding device, a method comprising:
2 monitoring bandwidth consumption by one or more types of packet
3 traffic received in the packet forwarding device;
4 determining whether the bandwidth consumption by the one or more
5 types of packet traffic exceeds a threshold; and
6 automatically changing assignment of at least one type of packet traffic
7 of the one or more types of packet traffic from a queue having a
8 first priority to a queue having a second priority if the bandwidth
9 consumption exceeds the threshold.
- 1 2. The method of claim 1 further comprising receiving program code in
2 the packet forwarding device after installation of the packet forwarding
3 device in a packet communications network and wherein said
4 monitoring, determining and automatically changing is implemented
5 by the executing program code.
- 1 3. The method of claim 2 wherein receiving the program code comprises
2 receiving a sequence of virtual machine instructions and wherein
3 executing the program code comprises executing the sequence of virtual
4 machine instructions using a virtual machine included in the packet
5 forwarding device.
- 1 4. The method of claim 3 wherein receiving the sequence of virtual

2 machine instructions comprises receiving a sequence of Java byte codes
3 and wherein executing the sequence of virtual machine instructions
4 using a virtual machine comprises executing the sequence of Java byte
5 codes in a Java virtual machine included in the packet forwarding
6 device.

1 5. The method of claim 1 wherein monitoring bandwidth consumption by
2 one or more types of packet traffic received in the packet forwarding
3 device comprises determining a measure of bandwidth consumption in
4 the packet forwarding device due to traffic associated with a physical
5 port on the forwarding device.

1 6. The method of claim 1 wherein monitoring bandwidth consumption by
2 one or more types of packet traffic received in the packet forwarding
3 device comprises determining a measure of bandwidth consumption in
4 the packet forwarding device due to traffic associated with a particular
5 network address.

1 7. The method of claim 6 wherein determining a measure of bandwidth
2 consumption in the packet forwarding device due to traffic associated
3 with the particular network address comprises determining a measure
4 of bandwidth consumption due to traffic associated with a particular
5 media access control (MAC) address.

1 8. The method of claim 1 wherein monitoring bandwidth consumption by
2 one or more types of packet traffic received in the packet forwarding
3 device comprises determining a measure of bandwidth consumption in

4 the packet forwarding device due to traffic associated with a particular
5 communications protocol.

1 9. The method of claim 8 wherein determining a measure of bandwidth
2 consumption in the packet forwarding device due to traffic associated
3 with the particular communications protocol comprises determining a
4 measure of bandwidth consumption in the packet forwarding device
5 due to traffic associated with at least one of the following protocols: file
6 transfer protocol (FTP), hyper-text transfer protocol (HTTP),
7 transmission control protocol/internet protocol (TCP/IP).

1 10. A packet forwarding apparatus comprising:
2 a plurality of input/output (I/O) ports to transmit and receive packets of
3 information;
4 first and second queues to buffer the packets prior to transmission via
5 one or more of the I/O ports, packets buffered in the first queue
6 having higher transmission priority than packets buffered in the
7 second queue;
8 queue assignment logic to assign the packets to be buffered in either the
9 first queue or the second queue according to a packet type associated
10 with each packet, each of the packets being associated with at least
11 one of a plurality of packet types; and
12 one or more agents to monitor bandwidth consumption by packets
13 associated with a first packet type of the plurality of packet types
14 and to automatically change assignment of packets associated with
15 the first packet type from the first queue to the second queue if

16 band width consumption of packets associated with the first packet
17 type exceeds a threshold.

1 11. The apparatus of claim 10 further comprising:
2 a processing unit coupled to the plurality of I/O ports, the processing
3 unit including a memory and a processor; and
4 a data communications interface to receive program code in the
5 memory of processing unit after installation of the packet
6 forwarding apparatus in a packet communications network and
7 wherein the one or more agents are implemented by execution of
8 the program code in the processor of the processing unit.

1 12. The apparatus of claim 11 wherein the packet forwarding apparatus
2 further comprises program code that, when executed by the processing
3 unit, implements a virtual machine, and wherein the program code
4 received via the data communications interface comprises a sequence of
5 instructions that is executed by the virtual machine to implement one
6 or more agents.

1 13. The apparatus of claim 12 wherein the program code received via the
2 data communications interface includes a sequence of Java byte codes
3 and wherein the virtual machine is a Java virtual machine.

1 14. The apparatus of claim 10 wherein the first packet type comprises
2 packets associated with a particular one of the I/O ports.

1 15. The apparatus of claim 10 wherein the first packet type comprises

2 packets comprises packets associated with a particular network address.

1 16. The apparatus of claim 15 wherein the particular network address is a
2 particular media access control (MAC) address.

1 17. The apparatus of claim 10 wherein the first packet type comprises
2 packets comprises packets associated with a particular communications
3 protocol.

1 18. The apparatus of claim 17 wherein the particular communications
2 protocol is a hyper-text transfer protocol (HTTP).

1 19. The apparatus of claim 17 wherein the particular communications
2 protocol is a file transfer protocol (FTP).

1 20. A communications network comprising a packet forwarding device, the
2 packet forwarding device including:
3 a plurality of input/output (I/O) ports to transmit and receive packets of
4 information from one or more other devices in the
5 communications network
6 first and second queues to buffer the packets prior to transmission via
7 one or more of the I/O ports, packets buffered in the first queue
8 having higher transmission priority than packets buffered in the
9 second queue;
10 queue assignment logic to assign the packets to be buffered in either the
11 first queue or the second queue according to a packet type associated
12 with each packet, each of the packets being associated with at least

13 one of a plurality of packet types; and
14 one or more agents to monitor bandwidth consumption by packets
15 associated with a first packet type of the plurality of packet types
16 and to automatically change assignment of packets associated with
17 the first packet type from the first queue to the second queue if
18 band width consumption of packets associated with the first packet
19 type exceeds a threshold.

1 21. The communications network of claim 20 wherein the packet
2 forwarding device further includes:
3 a processing unit coupled to the plurality of I/O ports, the processing
4 unit including a memory and a processor; and
5 a data communications interface to receive program code in the
6 memory of processing unit after installation of the packet
7 forwarding device in the communications network and wherein
8 the one or more agents are implemented by execution of the
9 program code in the processor of the processing unit.

1 22. The communications network of claim 21 wherein the packet
2 forwarding device further includes program code that, when executed
3 by the processing unit, implements a virtual machine, and wherein the
4 program code received via the data communications interface includes
5 a sequence of instructions that is executed by the virtual machine to
6 implement one or more agents.

1 23. In a packet forwarding device, a method comprising:

2 monitoring an error rate associated with one or more types of packet
3 traffic received in the packet forwarding device;
4 determining whether the error rate associated with the one or more
5 types of packet traffic exceeds a threshold; and
6 automatically changing assignment of at least one type of packet traffic
7 of the one or more types of packet traffic from a queue having a
8 first priority to a queue having a second priority if the error rate
9 exceeds the threshold.